

CONSTRUCTION OF A LAW SYSTEM FOR GREEN PRODUCTION IN CHINA UNDER THE PERSPECTIVE OF SYSTEM DYNAMICS KNOWLEDGE PEDIGREE¹



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Industrial production is an essential factor for economic development, while law system is a necessary tool for regulation. How to better guide enterprises toward green production with a law system requires close attention. The purpose of the article is to take system dynamics knowledge pedigree as the analysis frame, guide enterprises to step into green production by legal systems and build the green production legal system with Chinese characteristics. China has issued and implemented such laws and regulations on green production as Law of the People's Republic of China on Promotion of Cleaner Production and Circular Economy Promotion Law which, however, still have the deficiencies in operability and enforceability and cannot resolve problems of environmental pollution from industrial production fundamentally. It is necessary to improve the green production system with the system dynamics knowledge system. Methodology. System dynamics unifies the structural, functional and historical methods. Analytic approaches and Holistic approaches are mainly applied in this article. The analytic approaches focus on individual element in the system and the relationship between elements. It is applied in the analysis on the "lack" of order flow, people flow and money flow system and the "shortage" of equipment flow and material flow system, and stresses on macroscopic problems of individual elements. The holistic approaches emphasize on the whole system and the system structure. This article reviews the operation process for green production legal system from the whole system dynamics knowledge pedigree, innovates the adjustment method, breaks the old discipline system concept, fuses the system dynamics knowledge system into the construction of green production legal system, and focuses on macroscopic problems in system structure. Originality. This article applies system dynamics knowledge

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pedigree in the study of green production legal system to construct the system in consideration of the whole enterprise production process, and proposes detailed theories like establishing environmental profit and loss account and strategic EIA system as well as green financial system and raw material green production mechanism in enterprises. Findings. System dynamics absorbs the essence of cybernetics and information theory, and is a transverse discipline integrating the natural science and social science to understand and resolve system problems. After studying the system dynamics knowledge system, we find that it is closely related to both production and ecological environmental protection. Its life cycle curve and ecological model theory can be applied in the construction of green production legal system. Practical value. Theoretical study roots in realistic questions. Construction of green production legal system responds to the need for ecology civilization construction system put forth by Chinese government and provides a practical solution for promoting green development.

Keywords: Green production; System dynamics; Knowledge pedigree; Regulation; Law system; Cleaner production; Environmental problems; Environmental protection; Feedback loop; Environmental taxation system.

Since the 1990s, the environmental legislation in various countries has been evolving toward the establishment of a law system for circular economy, with a series of “green” laws enacted, including circular economy society promotion law, cleaner production law, and resource recycling law. Green production has witnessed a good effect in developed countries, enabling the industry in these countries to transform into a more environment-friendly green industry. Relative to developed countries, developing countries cannot realize all-round transformation and upgrade of heavy industry and chemical industry based on the actual needs of economic development, which hinders developing countries from transiting to the rank of green production countries at a fast speed. Green production is undoubtedly an inevitable choice for China to explore ecological civilization construction, but there is still certain dilemma in the construction of a law system for green production at present. As a result, the assumption of perfecting the law system for green production in China is proposed in this paper from the perspective of system dynamics knowledge pedigree.

I. Definition of Green Production

“Green production” originates from but differs from “cleaner production”. As an emerging strategy, “cleaner production” is proposed by Industrial Environment Activity Center of United Nations Environment Programme (UNEP), which is the initial manifestation of green production. Cleaner production mainly refers to the raw materials, technologies and other links of production and aims to avoid pollution of raw materials from the source and improve the utilization efficiency of products, to lower the harms on environment. Cleaner production is defined in Article 2 of the Law of the People's Republic of China on Promotion of Cleaner Production (2012) as follows: “Cleaner production refers to taking such measures as continuous improved design, use of clean energy and raw materials, application of advanced technology and equipment and

improved management and comprehensive utilization to reduce pollution from the source, improve the resource utilization rate, reduce or avoid the generation and emission of pollutants in the production, service and product use processes, thus relieving or eliminating the harm to human health and environment.” Despite of the significant contributions made by the law system of cleaner production to the environmental protection undertakings of China, there are still some deficiencies in implementation, that is, incapability of fundamentally solving the problem of pollution by industrial production. On October 31, 2019, it is proposed at the Fourth Plenary Session of the 19th Central Committee of the Communist Party of China that “we will perfect the law system and policy guidance for green production and consumption, develop green finance, promote market-oriented green technological innovation, and push forward the green, circular and low-carbon development with more consciousness.” Such an important decision pushed the green production toward a higher level and made up for the previous shortcomings, aiming at whole-process pollution control for industrial production, pollutants minimization and production optimization, which are also the core elements of “green production”.

How to define green production? Some scholars proposed that green production can be interpreted either in a broad or a narrow sense. “Green production in a broad sense, which runs through the entire life cycle of products, refers to minimizing the environmental pollution in all stages of products, including production, distribution, circulation and consumption; green production in a narrow sense, also called cleaner production, refers to that enterprises only control the pollution in production link through a series of technologies and management measures, to achieve energy conservation and emission reduction.”² In this paper, the concept of green production is mainly defined from a broad sense, and the viewpoint that green production can be defined from three dimensions is raised. The first dimension refers to the definition of product greening, that is, the products manufactured by enterprises must conform to the compulsory standards on environmental protection, avoid the use of toxic or harmful substances in terms of product composition, packaging and processing, and adopt the raw materials imposing zero or slight pollution on environment; the second dimension is to emphasize the production integrating the three aspects, namely, enterprise's interests, consumer's interests and environmental & ecological interests from the perspective of enterprise's production interests; the third dimension refers to the integral development of enterprises, which means that enterprises carry out whole-process greening transformation in production, to ultimately achieve the harmony and unity among enterprises, consumers and environment, and satisfy the common environmental requirements of the above three parties.

²YanBin Sun. Incentive Measures to Explore the Development of Chinese Green Production. Master's Thesis of Jilin University of Finance and Economics, 2014. P. 5-6.

II. Internal Relations between System Dynamics and the Law System for Green Production

(I) Definition of system dynamics knowledge pedigree

“System dynamics is a cross discipline integrating natural science and social science, while the science of human affairs, as a more important science in systematics, specializes in researching the operation conditions, laws and regulations in the system and aims to optimize the system operation.”³ According to the system dynamics theory, the operation of organization falls into six types, namely, order flow, people flow, money flow, equipment flow, material flow and information flow, which form the basic contents in system dynamics knowledge pedigree. The first five flows can be referred as material flow together, in which all-flowing materials feature conservation. While information flow bears, direct relations with system management and control and refers to the important basis and source of decision-making. Both producers and consumers without any consumption can jointly use information flow, so it is not characterized by conservation. What needs attention is that, it is usually these six flows that form the production system in economic production and operation process. Feedback Loop Analysis is an important tool for building the system dynamics model, and feedback is ubiquitous in the system. There will be various causalities when the feedback loop is in different situations, which can be classified into positive and negative feedback. The loop will be a negative feedback loop when the total number of negative casual chains in the loop is odd, and a positive feedback loop when the total number is even. Inventory control system is the best example of linking the feedback system with enterprise production.

As a classical feedback system, inventory control system reflects the entire goods production process, and the entire process formed by this feedback loop proves the significance of existence of the six flows in the system dynamics knowledge pedigree. The following six links will be experienced in this system: expected inventory, ordering, production, arrival of goods, inventory, and delivery. That is to say, delivery leads to inventory decrease. When the inventory is lower than the expected level by a certain value, the inventory management personnel will place an order to the production department in line with the predetermined policy. The goods may arrive after certain delay, and the inventory will eventually rise again. We can discover from the classic negative feedback system - inventory control system that production aims to realize order flow, while the production control means can standardize and control the enterprise production from the perspectives of ordering (material flow), production process (including people flow and money flow) and the final order flow, thus achieving green production of the enterprise.

(II) Correlation between System Dynamics and the Law System for Green Production

System dynamics bear close relations with the law system for green production. System dynamics refers to a discipline system covering science of human affairs, with the formulation, modification and implementation of laws and regulations forming an

³ZaiPu Tao. Introduction to System Dynamics. Fudan University Press (2018 Edition), ISBN 978-7-309-13969-3. P. 2.

important part of it. Conversely, the rational operation of green law system also endows system operation with continuous optimization. Owning a rigorous systematic frame, system dynamics knowledge pedigree can assist enterprises to have a more comprehensive understanding of the entire process of production development, while the law system constructed under the perspective of system dynamics can achieve Pareto optimality for green production control. System dynamics bears close relationship with green production and environmental protection, so linking system dynamics with the law system of green production is beneficial for developing system guarantee for order flow, people flow, material flow, equipment flow, money flow and information flow in system dynamics organization and operation.

Law system can realize direct standardization of people flow, which is the basic characteristic of law system. Besides, for realizing the entire process of production greening, the flow process of all flows can also regard the law system as the regulation hub. Law system, the only regulatory action with compulsory guarantee in information flow, guarantees the green production of enterprises with the coercive force of the country, which is different from price information which regulates the enterprises relying on the market. In our opinion, examining the operation process of the law system for green production and innovating the adjustment mode from the perspective of system dynamics refers to an emerging way of realizing green production. Under the guidance of system dynamics knowledge pedigree, the common goal of establishing a community with a shared future for mankind refers to transforming the possibility of environmental protection into feasibility through a perfect law system.

III. Characterization of the Problems in the Law System for Green Production

There are two problems during legal regulation of green production in China: first, problems in construction of law system, that is, defects in the control of order flow, people flow and money flow of enterprises. Second, problems in supervision of enterprise's production process, that is, insufficient supervision of equipment flow and material flow.

(I) Characterization I: “lack” of order flow, people flow and money flow system

The order flow is the market orientation for enterprises to manufacture products, and also the consumption orientation for consumers. With regard to consumption intention, there are laws prohibiting the selling of toxic and harmful substance, wild animals and other substances possible of seriously harming the ecological environment, but none is available for regulating consumers to purchase green products with mandatory requirements. The environmental protection issues concerning order flow can be fundamentally resolved only when the price demand and personalized consumption needs of consumers are met. Therefore, the task of guiding consumers to purchase green products must be attributed to the promotion of and subsidy to green products as well as the subsidy to consumers, which is unavailable in the law system for green production in China.

The construction of law system for people flow mainly stresses on the behavior regulation of what people should do and should not do. As the most common law system for behavior regulation, most laws of China tend to be “commanding”, with no enough

“guiding” or “promoting” regulations. Enterprises are “people flows” composed of multiple employees. It is true that mandatory regulations can play a pre-warning role, but for the subject seeking benefits and avoiding harms, indirect encouraging measures will play a better practical effect than those mandatory ones.

Money flow mainly aims at insufficient guarantee for green financial system. Along with the continuous enrichment of money source, the money source of enterprises is not only to rely on the money from production and consumption or the subsidy and award from the government, but also to cooperate with banks and insurance and securities companies with equal market position for more money. We believe that the only way to guarantee green production of enterprises is to adopt more favorable securities, loan and insurance regulations for enterprises aiming at production greening. Green finance is incorporated into key topics for discussion on the Fourth Plenary Session of the 19th Central Committee of the Communist Party of China, hoping to promote the green production development of China in this way.

(II) Representation II: "Shortage" of equipment flow and material flow system

The so called equipment flow means a retention state during enterprise production. For example, the plant construction, land occupation and assembly of necessary equipment required for enterprise production. China has also established the environmental impact assessment system for the equipment supervision under such a fixed retention state. Environmental impact assessment system is such a system to prevent the possible environmental impact from enterprises' raw materials (land and equipment). It aims to, before scale production for the enterprise location production, reviewing and assessing the enterprise' environmental hazard potential after land occupation, plant construction and equipment purchase by the state and then approving its continuous production or not based on the potential. We hold that the environmental impact assessment system as stipulated by laws assesses only the planned and constructed projects (new, rebuilt and expanded plants and other development activities), and neglects the assessment for "policies", "plans", "legalization", "decision" and other strategic environmental impact assessment. "The significance of implementing strategic environmental impact assessment lies mainly in that it can fill the gap of single project environmental impact assessment, realize the social and economic sustainable development and accelerate the realization for the public to participate in the government decision-making on environment and development."⁴ Presently, strategic environmental impact assessment is not included in *Law of the People's Republic of China on Environmental Impact Assessment* (revised in 2018) and needs to be further improved in environmental legislation.

The so called material flow refers to the flow of physical objects in connection to product manufacturing. It includes the flow of raw materials for manufacturing products, that products and pollutant. Existing positive legal provisions in China on green production material flow cover mainly environmental subsidies and environmental administra-

⁴Jin Wang. *Environmental Law* (the third version). Peking University Press, 2014, ISBN: 978-7-301-24541-5. P. 138.

tive reward, namely guiding enterprises toward green production by a series of production subsidy measures; the negative legal provisions set about environment taxes and fees. The environmental administrative reward system is a kind of environmental protection legal means to guide enterprises toward green production actively by material flow; however, explicit provisions on the conditions, level, money guarantee and awarding procedures are lacked for the environmental administrative reward system, and thus many laws and systems about environmental administrative reward become a dead letter and fail to positively facilitate the enterprise production."⁵ Environmental subsidy system is very important for developing countries as the environmental administrative reward system. Developing countries cannot migrate heavy polluting enterprises due to economic development factor, and enterprises thereof also cannot pay the price payable for environmental protection, and developing countries always choose to relieve their pressure on environmental protection by subsidy. However, excessive environmental subsidies will enhance enterprises' dependence, and less environmental subsidies will result in illegal emission. Therefore, moderate control is the most important factor for the environmental subsidy system. Environment taxes and fees turn to control manufacturer's material flow at negative level to ensure enterprises' green production, and the system of environment taxes and fees is also an environmental law system comprehensively implemented in China. Nevertheless, some scholars still put forward different views about it. "Problems still need to be identified in environmental tax legislation, such as determination of tax category and name, improvement of legislation objective, optimization of taxation elements, improvement of tax distribution, etc."⁶

IV. Response to Law System for Green Production under the Perspective of System Dynamics

Improving the law system for green production is the first barrier to be broke for realizing enterprise green production, and response to law system for green production under the perspective of system dynamics knowledge pedigree requires to construct the new law system for green production throughout the enterprise production (order flow, people flow, money flow, equipment flow, material flow and information flow). We believe that the law system for green production should tend more to an amiable, encouraging and stimulative law system establishment. Characteristics of other subjects should also be considered during the legalization of "supply" environmental law system to construct a law system meeting the social demands much more under the background of different systems.

(I) Construction of law systems for green order flow, people flow, money flow

Improving the subsidy for consumers on consuming green goods. Order flow is either the objective for enterprise production or the source and power for enterprise green

⁵BinBin Wu. Administrative Reward for Environment: Another Solution to Environmental Governance. *Journal of Hunan University of Science & Technology (Social Sciences Edition)*, ISSN: 1672-7835, Issue 3, 2017. P. 68.

⁶ShouWen Zhang. Three – dimensional Review of Environmental Tax Legislation in China. *Contemporary Law Review*, ISSN 1003-4781 Issue 3, 2017. P. 15-16.

production, and consumers' needs decide enterprises' production objective. Therefore, subsidies for consumers on consuming green goods should be improved in environmental subsidies to give incentives to enterprises for green production. For example, US implements a decision on consumption tax exemptions and reductions for green products manufactured by environmental protection enterprises, which makes consumers purchasing environmental protection products can buy them with a lower price, guiding consumers to buy green environmental protection products. We hold that the premise for enterprises to produce green products is the subsidy for enterprises' green environmental protection products, and enterprises can get consumers' attention with their low price; it is one of the important approaches to realize green and environmental protection order flow.

Establishing enterprise environmental profit and loss account. People flow is easiest to be neglected in the law system, namely guiding enterprises' working staff to revere green production. In the original law system, enterprises are habitually standardized as an integral whole; however, enterprises are actually constituted by individuals, and further progress may be made by guiding employees toward environmental protection than guiding a created integral legal person, so we think we should establish enterprises' environmental profit and loss account. It should be noted that we may fail to achieve good results just by rewarding employees to improve environment; environmental protection can be improved from the prospective of system guarantee only by "giving opportunities to employees to participate in environmental protection management, including them as a part for environmental management and combining such a management behavior with employee rewards".⁷

Constructing enterprise green financial system In light of enterprises' money flow, the environmental subsidy measures taken in the past are far not enough to meet the enterprise development needs, and it is urgent to construct a suitable enterprise green financial system. China should further improve the legislation for green development from investment, securities, insurance and banks and construct a market subsidy mechanism. We think that to improve the green financial system, the tenet of implementing one-to-one financial subsidy based on green environmental protection enterprises, green production process and green products must be determined first, to build equal market subject and furthermore address fund shortage in enterprise transformation and upgrading.

(II) Construction of law systems with green equipment flow and material flow

Establishing strategic environmental impact assessment system. Environmental impact assessment system can prevent the possible environmental impact from enterprise raw materials (land and equipment). In consideration of the limitation of the environmental impact assessment system, the scope for assessment should be expanded, and antecedent supervision should be strengthened particularly on the assessment for "policies", "plans", "legalization", "decision" and other strategic environmental impact

⁷DianHua Wang, YuanYuan Zhao and YinYin Ding. Establishment and Implementation of Enterprise Environmental Profit and Loss Account: Combination of Environmental Accounts and Reward System. Friends of Accounting, ISSN 1004-5937 Issue 2, 2018. P. 31-34.

assessment, to improve the execution of environmental impact assessment. Moreover, improve furthermore the approval procedure and public participation mechanism during assessment and construct a more excellent raw material green production preventive mechanism.

Constructing improved raw material green production mechanism. In view of the deficiencies of existing law system for green production, a more complete law system should be established by filling the gaps and loopholes. For example, more specific measures must be published for environmental reward system and environmental subsidy system for "accurate diagnosis" to promote a smooth green production. "Exempt and reduce certain income taxes for manufacturing enterprises conforming to the energy conservation standard, expand the taxation scope for land resources, water resources and other scarce resources and improve the rates appropriately to guide enterprises toward green and environmental protection production."⁸ More specific stipulations about environmental subsidy should be formulated on that basis to ensure a more enforceable environmental protection measures. "We can learn more from the study on environmental subsidy policy in Europe that constructing a suitable environmental study law system will greatly and positively accelerate enterprises' green production."⁹ Environmental reward is the best measure to positively promote enterprise production, and its concretization and implementation must be improved emphatically. More specific provisions of laws should be formulated for the condition, level, money guarantee and rewarding procedure of environmental administrative reward system, ensuring the tendency for enterprise production and a more complete reward guarantee. In view of the improvement for system of environment taxes and fees, we hold that the system of environment taxes and fees in China stresses much more on environmental administrative regulation, but promotion of green production needs greening environmental taxation system, namely formulating taxation standards for enterprises based on sustainable development, but not punishing the illegal enterprises.

Conclusion

Ecological environmental protection is a common aspiration of the people over the world, and the objective for China to put forth constructing "community of shared future for mankind". More environmental group incidents warn us not to neglect the ecological environmental protection. Humans live at the top of the ecosystem, and their every move will exert an important influence on the whole ecosystem. Since from January 2020, the "novel coronavirus" (COVID-19) epidemic gave China and the world great warnings as a Public Health Emergency of International Concern (PHEIC) by WHO". Industrial production is the source of all substances required for human development, but humans also face with increasingly severe ecological and environmental problems, and construc-

⁸YanBin Sun. Incentive Measures to Explore the Development of Chinese Green Production. Master's Thesis of Jilin University of Finance and Economics, 2014. P. 33-34.

⁹Bigerna S, Xingang Wen, Hagspiel V, et al. Green Electricity Investments: Environmental Target and the Optimal Subsidy. Social Science Electronic Publishing, 2018. P. 10.

tion of the law system for green production is becoming the direction for efforts of China. Industrial production is an essential factor for economic development, while law supply is a necessary tool for regulation. How to better guide enterprises toward green production with law system requires close attention, and the system dynamics knowledge pedigree gives us helpful inspirations that deserves further discussion and study.

Бо Ма, з.ғ.д, профессор, гуманитарлық ғылымдар мен құқық факультетінің деканы, Гуандун мұнай-химиялық технологиялар университеті (Мао-мин, Қытай); Чжу-Ци Хэ, құқық магистрі, Құқық мектебі, Чунцин Университеті (Чунцин, Қытай): Жүйелі білім динамикасының бастауы тұрғысынан Қытайда жасыл өндіріс үшін құқықтық жүйе құру.

Өнеркәсіптік өндіріс экономикалық дамудың маңызды факторы, ал құқықтық жүйе реттеудің қажетті құралы болып табылады. Кәсіпорындарды экологиялық таза өндіріске құқықтық жүйенің көмегімен бағыттау қажеттігі мұқият зерделеуді қажет етеді. *Мақсат.* Мақаланың мақсаты – жүйелік динамика туралы білімнің этимологиясын заңды жүйелерді қолдана отырып, экологиялық таза өндіріске көшу кезінде кәсіпорындарға көмек көрсетуді талдау негізі ретінде пайдалану, сонымен қатар Қытай заңнамасының талаптарын ескере отырып, экологиялық таза өндірістің құқықтық жүйесін құру. Қытай «жасыл» өндіріс туралы келесі заңдар мен ережелерді қабылдады және қолданысқа енгізді: Қытай Халық Республикасының Экологиялық таза өндіріске жәрдемдесу туралы Заңы, сондай-ақ Экологиялық таза экономикаға жәрдемдесу туралы Заңы, алайда, олар әлі де практикалық қолдануда кемшіліктерге ие және қоршаған ортаны өнеркәсіптік өндірістен ластау мәселелерін шеше алмауда. *Әдістеме.* Жүйелік динамика құрылымдық, функционалдық және тарихи әдістерді біріктіреді. Мақалада негізінен талдау және тұтастау тәсілдері қолданылады. Талдау тәсілі жүйенің жекелеген элементтеріне және элементтер арасындағы байланысқа назар аударады. Ол тапсырыс ағынының «болмауын», адамдар ағыны мен ақша ағындарының жүйесін, жабдық ағынының «жетіспеушілігін» және материалдық ағындар жүйесін талдауда қолданылады, сонымен қатар жекелеген элементтердің микроскопиялық проблемаларына екіпін салады. Тұтастау тәсілі бүкіл жүйені және оның құрылымын тұтастай қарастыруға баса назар аударады. Бұл мақалада «жасыл өндірістің» құқықтық жүйесінің жұмыс істеу процесі бүкіл жүйенің динамикасы туралы білімнің этимологиясы тұрғысынан қарастырылады, түзету әдісінде инновация енгізіледі, пәндер жүйесінің тұжырымдамасы қайта қаралады, «жасыл өндірістің» құқықтық жүйесін құрудағы жүйенің динамикасы туралы білімдер жүйесі біріктіріледі және жүйе құрылымындағы микроскопиялық проблемаларға екіпін салынады. *Жаңашылдығы.* Авторлар кәсіпорынның бүкіл өндірістік процесін ескере отырып, жүйені құру үшін «жасыл» өндірістің құқықтық жүйесін зерттеуде жүйелік динамика туралы білімнің этимологиясын қолдану қажеттігін дәлелдейді. Авторлар пайда мен шығындардың экологиялық есебін, стратегиялық ЕІА жүйесін, сондай-ақ жасыл қаржы жүйесін және кәсіпорындарда жасыл шикізат өндіру механизмін құру сияқты теорияларды нақтылауды ұсынады. *Негізгі қорытындылар.* Жүйелік динамика кибернетика мен ақпа-

рат теориясының мәнін біріктіреді. Ол – жүйелік мәселелерді түсіну және шешу үшін жаратылыстану және әлеуметтік ғылымдарды біріктіретін пән. Жүйелік динамика туралы білімдер жүйесін зерттей отырып, авторлар оның қоршаған ортаны әрі өндірістік, әрі экологиялық қорғаумен тығыз байланысты екенін анықтады. Жасыл өндірістің құқықтық жүйесін құруда өмірлік цикл қисығы мен экологиялық модель теориясын қолдануға болады. *Тәжірибелік құндылығы.* Теориялық зерттеу шынайы проблемаларға негізделген. «Жасыл» өндірістің құқықтық жүйесін құру Қытай үкіметі ұсынған экологиялық өркениеттің құрылыс жүйесінің қажеттіліктеріне жауап береді және «жасыл» дамуды алға жылжыту үшін практикалық шешім ұсынады.

Тірек сөздер: жасыл өндіріс; жүйелі динамика; білім этимологиясы; реттеу; құқықтық жүйе; таза өндіріс; қоршаған орта проблемалары; қоршаған ортаны қорғау; кері байланыс; экологиялық салық салу жүйесі.

Бо Ма, д.ю.н., профессор, декан факультета гуманитарных наук и права, Гуандунский университет нефтехимических технологий (Маомин, Китай); Чжу-Ци Хэ, магистр права, Юридическая школа, Университет Чунцин (Чунцин, Китай): Создание правовой системы для зеленого производства в Китае с точки зрения истоков системной динамики знаний.

Промышленное производство является важным фактором экономического развития, а правовая система необходимым инструментом регулирования. Необходимость ориентирования предприятий на экологически чистое производство с помощью правовой системы требует более пристального рассмотрения. *Цель.* Целью статьи является использование этимологии знания системной динамики в качестве основы анализа помощи предприятиям при переходе на экологически чистое производство с помощью правовых систем, а также создать правовую систему экологически чистого производства с учетом требований китайского законодательства. Китай издал и ввел в действие следующие законы и положения о «зеленом» производстве: Закон Китайской Народной Республики о содействии экологически чистому производству, а также Закон о содействии экологически чистой экономике, которые, однако, все еще имеют недостатки в практическом применении и не могут решить проблемы загрязнения окружающей среды от промышленного производства. *Методология.* Системная динамика объединяет структурный, функциональный и исторический методы. В статье в основном используются аналитический и холистичный подходы. Аналитический подход фокусируется на отдельных элементах системы и взаимосвязи между элементами. Он применяется при анализе "отсутствия" потока заказов, системы потока людей и денежных потоков и "нехватки" потока оборудования и системы материальных потоков, а также акцентирует внимание на микроскопических проблемах отдельных элементов. Целостный подход делает акцент на рассмотрении всей системы и её структуры в целом. В данной статье рассматривается процесс функционирования правовой системы «зеленого производства» из этимологии знаний о динамике всей системы, внедряется инновация в методе корректировки, пересматривается концепция

системы дисциплин, объединяется система знаний о динамике системы в построении правовой системы «зеленого производства» и делается акцент на макроскопических проблемах в структуре системы. *Новизна.* Авторы доказывают необходимость использования этимологии знания системной динамики при изучении правовой системы «зеленого» производства для построения системы с учетом всего производственного процесса предприятия. Авторы предлагают уточнить такие теории, как создание экологического отчета прибылей и убытков, стратегической ЕИА системы, а также зеленой финансовой системы и механизма зеленого производства сырья на предприятиях. *Основные выводы.* Системная динамика объединяет в себе сущность кибернетики и теории информации. Она представляет собой дисциплину, объединяющую естественные и общественные науки для понимания и решения системных проблем. Изучив систему знаний о системной динамике, авторы обнаружили, что она тесно связана как с производственной, так и с экологической защитой окружающей среды. Кривая жизненного цикла и теория экологической модели могут быть использованы при построении правовой системы зеленого производства. *Практическая ценность.* Теоретическое исследование основывается на реалистичных вопросах. Построение правовой системы «зеленого» производства отвечает потребностям системы строительства экологической цивилизации, предложенной правительством Китая, и предоставляет практическое решение для содействия «зеленому» развитию.

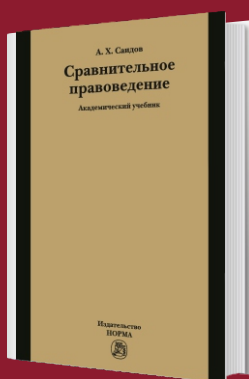
Ключевые слова: зеленое производство; системная динамика; этимология знания; регулирование; правовая система; чистое производство; проблемы окружающей среды; защита окружающей среды; обратная связь; система экологического налогообложения.

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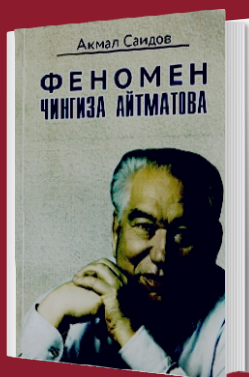
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НОВЫЕ КНИГИ

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Книга академика А.Х. Саидова посвящена размышлениям о творческом наследии и дипломатической деятельности писателя с мировым именем, одного из глубочайших умов XX столетия, общественного и государственного деятеля Чингиза Айтматова. В ней рассматриваются огромный духовный пласт и актуальность проблем, заложенных в произведениях Ч. Айтматова, которые требуют глубокого исследования в системе ценностей мировой культуры.

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